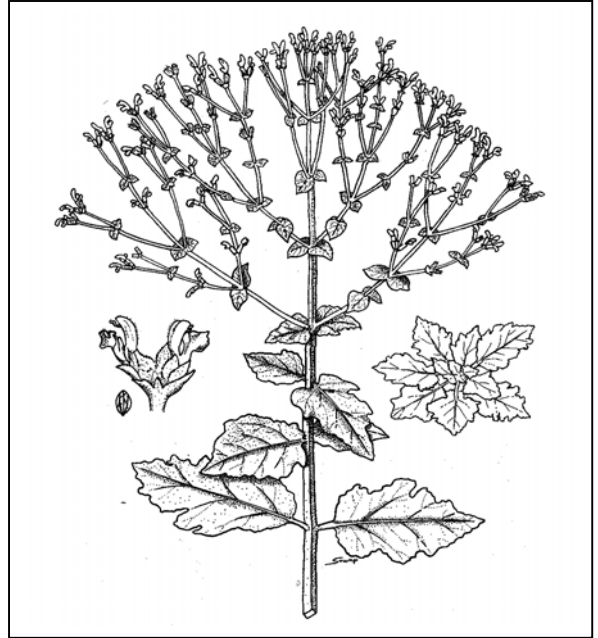


MEDITERRANEAN SAGE

Salvia aethiopis

Life History/Identification:

Mediterranean sage is a member of the mint family and is an erect, coarse biennial or short-lived perennial plant. The square stem, opposite leaves, and candelabra-like flowers are typical of the mint family. When crushed, a sage-like odor is emitted, which is how the plant derived its common name. The plant has a deep taproot and it quickly develops during the seedling stage. In Northern Arizona, Mediterranean sage begins germination and emergence of the first year rosette leaves in late summer or early fall, or when the weather becomes warmer in the early spring. The plant forms a basal rosette of seven to ten woolly leaves that lay close to the ground. In the late spring, infested areas take on a characteristic gray-green color when seen from a distance because of the dense silver white hairs on the plant. A mature weed can reach up to three feet in height and will eventually lose its felt-like covering of hairs. Most leaves are basal, with irregular or indented margins, ranging from four to twelve inches long. The upper leaves are opposite, smaller, and they clasp onto the stem. The uppermost leaves are reduced to bracts with long tapering points, often tinged with a purplish color. Flowering stems bolt as a single, squarish stalk, and develop into a cluster of small white flowers. Individual flowers are about ½" long, have five petals, and will produce four smooth, egg-shaped seeds. A mature Mediterranean sage can produce up to 100,000 seeds. The seeds are brown and have dark veins, and are usually dispersed in September or October, when consistent moisture is available for germination. Mediterranean sage acts like a tumbleweed to disperse its seed. The flowering stem has an abscission line about five inches from the ground that becomes brittle and breaks off. These stalks roll with the wind, often ending up in fence lines or creek bottoms.



Northern Arizona Localities:

Outside of its native range, Mediterranean sage prefers soils that are 14 to 16 inches deep, with good drainage. It is often found on south-facing slopes in loose, gravelly soil. The weed prefers to be in an environment that has 12 to 24 inches of annual precipitation, and will inhabit drained riparian areas and dry pastures. Initially, the plant will occupy disturbed areas, but it can spread to non-disturbed land and reach dominance. In the Flagstaff region, the largest known population is in the Lake Mary drainage and down Lake Mary Road into University Heights. A major concern is that the frequent traffic and recreational use in the area will transport seeds to other locations. It is believed that this is how Mediterranean sage was transported to the South Rim of the Grand Canyon.

Origin and Impacts:

Mediterranean sage is native to southern and southeastern Europe, with its northern range extending to the former Czechoslovakia and south central Russia, and east through Turkey and into Iran. It was introduced into the United States as a garden ornamental and as a contaminant in alfalfa seed. Historically, the plant was used as an organic dressing for wounds, but outside of its native range it has proven to be an aggressive pest. The plant is primarily a rangeland weed, although it does occur in alfalfa and grain crops. The biology of this plant is well adapted to facilitate its spread in many western states. Because Mediterranean sage produces large amounts of seed, has the ability to achieve dormancy in drought-like conditions, and can adapt to a wide variety of environmental

conditions, it poses a serious threat to native foliage. As an example of the rate of spread of Mediterranean sage, the population in Oregon jumped from 42,000 acres to over 100,000 acres in six years. It is estimated that about 1.3 million acres of land is now infested in the United States. Without a concerted effort at control, Mediterranean sage can also become a dominant invader in Arizona.

Control:

An integrated combination of control methods will be needed to successfully manage Mediterranean sage. Prevention and detection of new populations, as well as eradication and containment of existing populations, needs to be addressed. Mapping of the distribution and extent of the plant is also necessary to determine which combinations of control methods will be the most effective in each circumstance.

Cultural Control:

Prevention is the most effective and least expensive method of control. Plan activities to avoid areas where there is an infestation of Mediterranean sage. Clean all equipment, tires, boots, and animals when leaving an area that is infested by this plant. No control plan will be effective unless the re-establishment of preferred vegetation is considered. Reseed any disturbed sites with vigorous, hardy, early successional natives.

Mechanical Control:

Individual plants can be dug out. When the plant begins to bolt, cut or dig up the taproot two to three inches below the crown. This prevents re-sprouting of Mediterranean sage. Tillage does work but it is recommended for accessible areas only. Mowing several times during the growing season will prevent seed production, but the rosettes are low enough to the ground to escape most damage. Mowing, however, will spread the seeds if it is done too late in the year.

Chemical Control *(Noted here are chemical control techniques that have been used in other areas. Always check with weed specialists or chemical suppliers before treatment to ensure correct dosage and application. Mention of these products does not imply endorsement by the USDA Forest Service, Northern Arizona Weed Council or The Nature Conservancy.):*

- 1) When applied to Mediterranean sage before it bolts, picloram at a rate between 0.375 and .5 pound active ingredient per acre kills existing plants and seedlings from late germinating seeds. A surfactant is necessary for plants in the rosette stage. Spring application has a longer residual effect on new seedlings, and fall application releases desirable vegetation from competing with Mediterranean sage during spring growth.
- 2) Clopyralid will kill existing plants without residual effects, and has proven to be an effective herbicidal control.

Biological Control *(No exotic species should be introduced into an ecosystem without extensive research into the long-term effects. Mention of the species below does not imply appropriateness for use in Northern Arizona.):*

The European crown-boring weevil was introduced in 1969, and populations are now established in Idaho, Oregon, and California. This insect slows seed production, and the population density of Mediterranean sage has been reduced. However, weevil populations are slow to establish and they alone will not control the spread of Mediterranean sage. The caterpillar stage of a moth that feeds on this plant is effective only on the first year rosettes, but it has no impact on mature plants.

Note: No single control method, or any one-year treatment program, will ever achieve effective control of an area contaminated with Mediterranean sage. The fast growth, high seed viability, fast rate of spread, and adaptability of this plant require long-term cooperative integrated management programs and planning to prevent, contain, and reduce Mediterranean sage infestations.

Moser, L; D. Crisp. San Francisco Peaks Weed Management Area fact sheet on *Salvia aethiopis*. Coconino National Forest.